

Correspondence

New technique for showing the relation of tomographic myocardial perfusion images obtained with thallium-201 to the coronary arteries

Sir,

We note with interest the recent article by Gibson *et al* (1985; 54: 367-74). We would like to compliment the authors on the quality of image data which they have obtained but we have some reservations about the clinical conclusions that they draw. There is no doubt that the presence of coronary stenosis will be one factor that will determine the distribution of thallium throughout the myocardium in coronary artery disease. There are, however, additional factors to be considered. For example the nature of the coronary circulation may have a profound influence on the distribution of the isotope. Although most patients have a right dominant circulation, balanced and left dominant circulations are not uncommon. The authors used a cast of coronary arteries obtained from one normal necropsy specimen and they related image defects seen on the tomographic data to this single cast. This cannot be appropriate for all patients and may lead to erroneous statements about the involvement of individual coronary arteries.¹ Furthermore, coronary collateral circulation may have a major effect on myocardial nuclide distribution in coronary artery disease. Although there is controversy about the precise value of collateral circulation there is no doubt that in some instances coronary collaterals can provide at least relative protection from stress induced ischaemia in the context of thallium distribution.² The authors also failed to address themselves to the question of patients with multiple vessel disease, who belong to an important group from the point of view of prognosis. Such patients may well be difficult to identify³ even by tomographic techniques⁴ since we may identify ischaemia in only one of a number of potentially ischaemic zones.

Finally we suspect that thallium scintigraphy will never provide data on the localisation of coronary artery disease sufficient to guide surgeons in coronary bypass grafting. Not only the presence of disease but also the precise location of stenoses in the coronary tree, the number of stenoses in a given vessel, and the quality of distal vessel are major anatomical factors which will guide our surgeons in their

decisions on coronary artery bypass grafting. It is unlikely that thallium scintigraphy, even when a tomographic approach is used, will provide such detail. We feel, therefore, that although this technique may be one step forward towards localising coronary artery disease by thallium scintigraphy it is far from being the final solution.

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References

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- 2 Wainwright RJ, Maisey MN, Edwards AC, Sowton E. Functional significance of coronary collateral circulation during dynamic exercise evaluated by thallium-201 myocardial scintigraphy. *Br Heart J* 1980; 43: 47-55.
- 3 Murray RG, McKillop JH, Bessent RG, *et al*. Evaluation of thallium-201 exercise scintigraphy in coronary heart disease. *Br Heart J* 1979; 41: 568-74.
- 4 Mills JA, Flint J, Taylor DN, Delchar T, McIntosh JA, Pilcher J. Thallium-201 scintigraphy for ischaemic heart disease and infarct detection: comparison of rotating slant-hole tomography and planar imaging. *Br J Radiol* 1985; 58: 625-34.

This letter was shown to the authors, who reply as follows:

Sir,

We feel that Dr Murray and Dr Flint may have missed the point of our paper. They have summarised the now well accepted arguments on the relation between myocardial perfusion imaging and coronary angiography. Conclusions which have in the past been drawn about this relation and the extent to which the distribution of thallium-201 in

myocardium can be determined by gamma camera imaging are largely based on techniques that use planar imaging or, to a lesser extent, limited angle tomography. Experience in the applications of radionuclide imaging shows that there is considerable capacity for such images to mislead the observer. It is possible therefore that some of the conclusions which have been drawn by workers using such techniques in the past may be erroneous.

We have described a technique for the use of transverse tomographic section data to construct an easily recognisable display. We have suggested that this represents a useful step forward towards gaining acceptance of the use of thallium-201 for localising coronary artery disease. The implication is that with improvement in imaging techniques associated with the current more widespread access to single photon tomography,¹ the role of thallium-201 should be re-evaluated. Thus there are now reports indicating that transverse tomography with thallium-201 can show the location of disease determined angiographically.^{2,3} We have not suggested that thallium-201 tomography can universally replace coronary angiography. Its role is more likely to be complementary, not only in the exclusion of important coronary artery disease in patients with atypical symptoms, but also in other applications such as determining the significance of moderate coronary

artery lesions shown angiographically, or identifying areas that are potentially suitable for revascularisation.

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- 1 Williams ED, ed. *An introduction to emission computed tomography*. Report No. 44. London: Institute of Physical Sciences in Medicine, 1985.
- 2 Garcia EV, Van Train K, Maddahi J, *et al*. Quantification of rotational Thallium-201 myocardial tomography. *J Nucl Med* 1985; **26**: 17-26.
- 3 Tamaki N, Yonekura Y, Mukai T, *et al*. Segmental analysis of stress thallium myocardial emission tomography for localisation of coronary artery disease. *Eur J Nucl Med* 1984; **9**: 99-105.

Notices

British Cardiac Society

The Autumn Meeting will be held at the Wembley Conference Centre, London, on 25 to 27 November 1986.

The closing date for receipt of abstracts has been changed to 11 July 1986 and is not as indicated in earlier notices.

Blood vessel imaging using ultrasound techniques

The 2nd International Conference Workshop on Blood Vessel Imaging Using Ultrasound Techniques will be held in Southampton on 4 and 5 September 1986. An associated introductory course will be held on 6 November 1986. Further information from: Mr K N Humphries, Scientific Director, Vascular Unit, Medical Physics Department, Level D, Centre Block, Southampton General Hospital, Southampton SO9 4XY.